

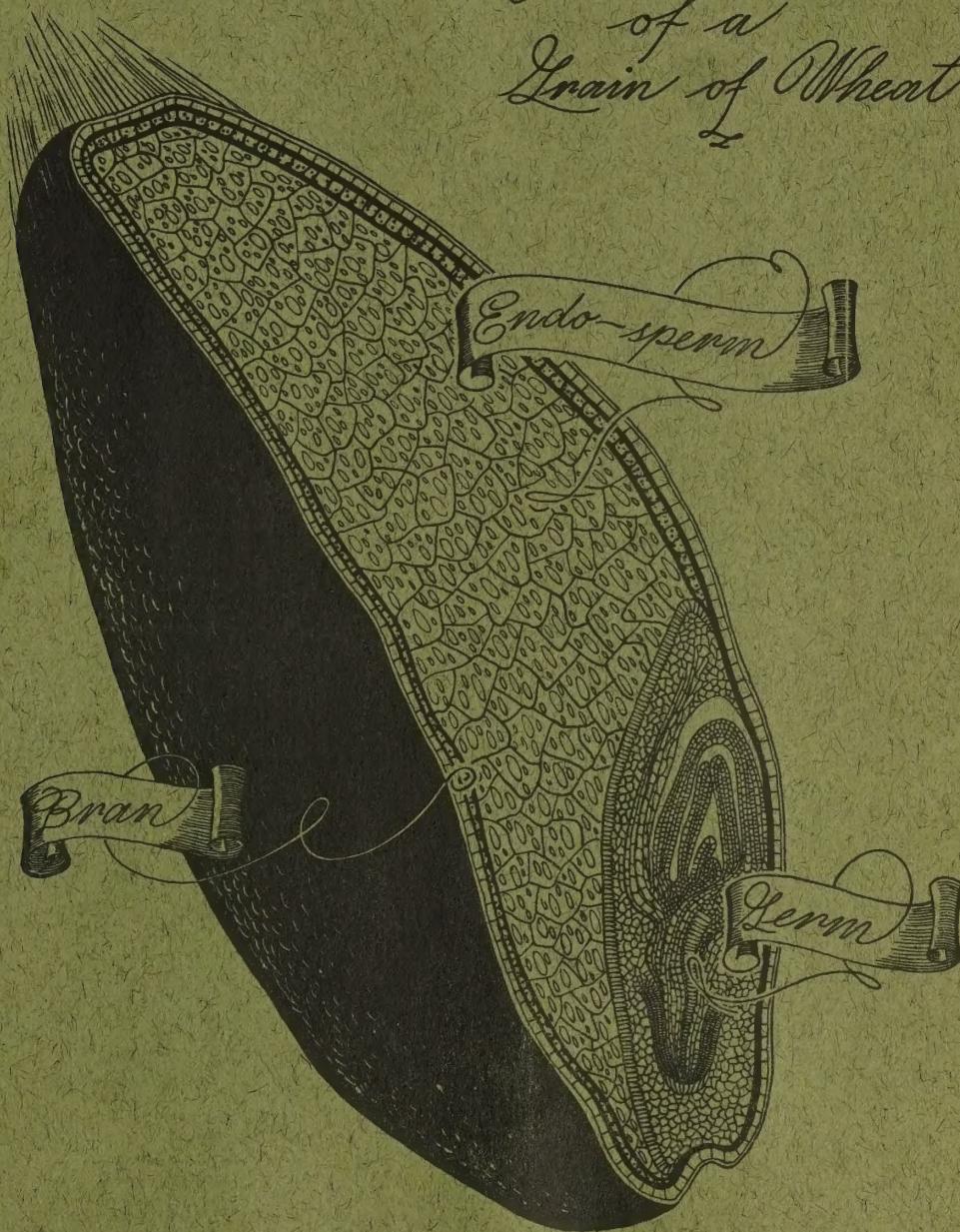
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HOME AND COMMUNITY MILLING

FOR NATIONAL DEFENSE FOR BETTER HEALTH

Longitudinal Section
of a
Grain of Wheat



In the preparation of this pamphlet free use has been made of "Milling at Home for Better Farm Living," with the generous consent of the author, C. V. Phagan, Extension Agricultural Engineer, Clemson College, South Carolina. REA gratefully acknowledges its indebtedness to him and to Director Watkins of the South Carolina Extension Service for their fine cooperation. Data on composition of wheat grain and products has been furnished by Dr. J. A. LeClerc, Senior Chemist, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture.

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CALL TO ACTION

A most important conference was called by the President of the United States in Washington, D. C., May 26-28, 1941. This was the National Nutrition Conference for Defense. It was attended by 900 picked leaders in nutrition, medicine, public health, education, home economics, and social work, and representatives of agriculture, labor, industry, consumers, and government. During its sessions a state of Unlimited National Emergency was proclaimed by the President.

In his letter to the Conference the President said that "every survey of nutrition. . .shows that here in the United States undernourishment is widespread and serious." This statement was read by the Chairman of the Conference, Paul V. McNutt, Federal Security Administrator and Coordinator of Health, Welfare and Related Defense Activities, and quoted by Surgeon General Thomas Parran, U. S. Public Health Service. It met with no dissent. M. L. Wilson, Director of Extension Work and Chairman of the Nutrition Advisory Committee to the Coordinator of Health, Welfare and Related Defense Activities said, "Call it malnutrition, call it undernourishment, call it dietary deficiency or what you will -- when men and women and children fail to eat the foods that give them full life and vigor, they are in fact starving. . .40 percent of our people have poor and inadequate diets."

General Hershey, Deputy Director of the Selective Service System, added, "We are physically in a condition of which we nationally should be thoroughly ashamed. It is a condition we should recognize as dangerous and which we should take immediate, positive, and vigorous measures to correct."

The Conference, after consideration of these disturbing facts, pledged full support to the President in mobilizing our national food resources, not only to meet the present emergency, but to formulate and carry through a National Nutrition Program calculated to reach every community and individual. Such a program will build here in America "a better and stronger race, with greater average resistance to disease, greater average length of life, and greater average mental powers," to the end that democracy may "point the way to a new and better civilization for oppressed peoples all over the earth."

Various causes are responsible for the serious malnutrition which brought this Conference together, but the consensus among nutritionists places the chief responsibility on white bread made out of white (patent) flour. High speed, commercial milling removes vital bran and wheat germ from the grain. The resulting white flour has lost vitamins and minerals as essential to the human system as oil and grease to an automobile. To many nutritionists white bread is "anaemic" or "ghost" bread. Only bread made from whole grain can be called truly the "staff of life." The so-called "enriched" flour and "enriched" bread, which is the result of a truce between the nutritionists, the millers and the bakers, is at best a make-shift expedient. Only some of the vital factors of which the "staff of life" has been robbed are restored to such flour and bread. "Why not go the whole figure and restore all the factors?" asked Dr. John R. Murlin, Professor of Physiology, Rochester University, in his address before the Conference. He answered his question by saying, "At the present time that can be done in only one way, namely, by producing whole wheat flour and making whole wheat bread." This answer is the more significant as Dr. Murlin was the principal adviser in all nutritional activities for the U. S. Army during the first World War. One of the leading British medical journals (*The Lancet*) declares that "the signpost points to wholmeal as the high-road to better health and greater economy, more particularly for the growing child, but also for men and women."

The Rural Electrification Administration advocates home and community milling as a valuable contribution towards solving the problem of malnutrition, so far as wheat bread and cereals are concerned. Development of small mills on REA-financed systems will be a distinct aid to better farm living, both nutritionally and financially.

HOME MILLING MEANS BETTER HEALTH

The "staff of life" has slipped badly. "It ain't what it useter was." It must be redeemed and brought back to its fine old self. Home milling is the best way to do it. Milling at home permits the farm family to get all the wholesome goodness and strength out of the wheat kernel. A flip of the switch will set in motion the motor and the little mill that does not crush the life out of the wheat. We can almost hear the grains singing to the little mill, "You don't murder us, and turn us into ghost-like flour. You mother us. We like it; and we give you every speck of God-given nutriment we've got."

McCollum and Simmons, nutrition authorities, in the third edition of their book, "The Newer Knowledge of Nutrition," page 131, say: "Wheat flour is conspicuously lacking in calcium, sodium, chlorine, iron and phosphorus...and is very deficient in all vitamins."

Pound for pound the body fuel values of whole wheat flour and of white flour is about the same. White flour also contains about 90 percent as much protein as whole wheat flour. But the real inferiority of white flour as a "protective" food lies in the milling loss of the minerals and vitamins so essential to human health.

In home-ground whole wheat flour the amount of vitamin B₁ (thiamin chloride) is approximately six times as great as in ordinary white flour; the amount of iron, five times; phosphorus, more than four times; calcium, more than twice; magnesia, eight times. The superiority of whole wheat flour is even greater with respect to vitamin B₂ (riboflavin) and vitamin E. (See Figure 1.)

Whole wheat flour contains the bran and the germ of the wheat kernel, where most of the minerals and vitamins are stored.

In addition to whole wheat flour, whole wheat cereals, corn meal, and grits are other nutritious and palatable products that can be milled at home.

Excellent recipes for the use of the home miller are available. Farmers' Bulletin No. 1775, U. S. Department of Agriculture, "Home-made Bread, Cake and Pastry" is suggested.

The nutritional advantages of home milling may also be had from Community Milling in which a small mill is set up on a selected farm, the schoolhouse or the REA Co-op headquarters.

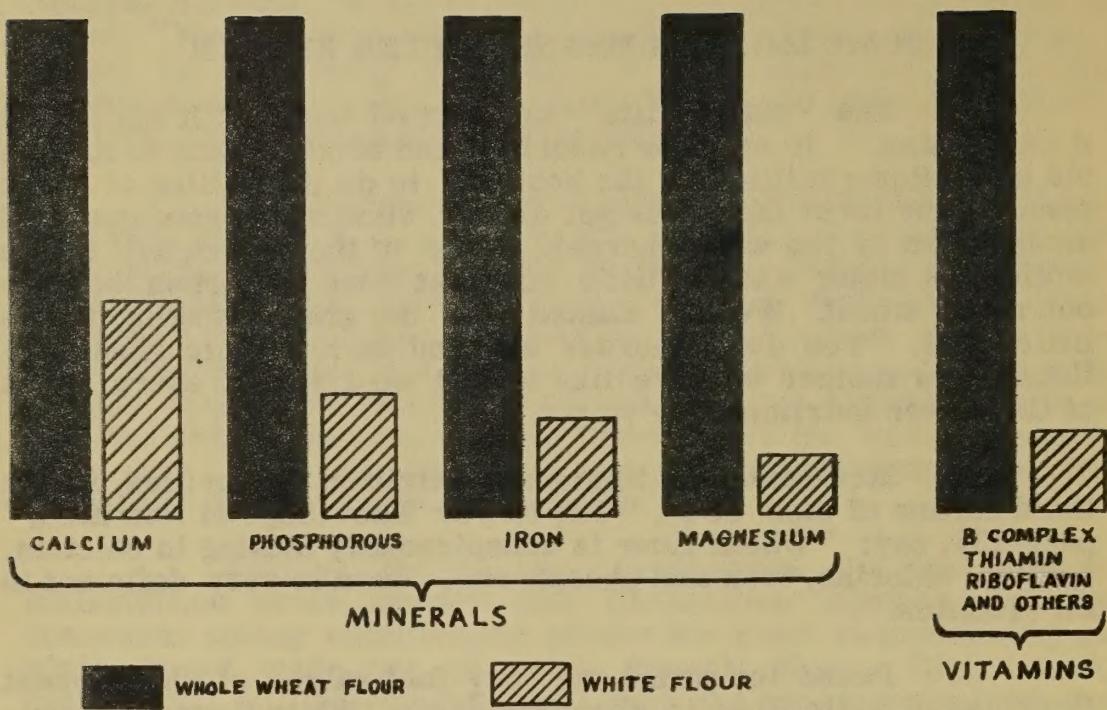


Figure 1. COMPARISON OF WHOLE WHEAT FLOUR AND OF ORDINARY WHITE FLOUR

PROFITS FROM HOME MILLING

From a strictly monetary standpoint home milling (or community milling) is a profitable undertaking, especially for the farmers following the Better Farm Living program who grow enough wheat and corn for home use. However, even when it is necessary to buy the grain, home milling is still advantageous in price. On the average, a bushel of wheat (60 lbs.) will buy only 20 pounds of white flour at the retail store. This same bushel of wheat will make 60 pounds of whole wheat flour, which has food value far in excess of 60 pounds of white flour. At 80 cents a bushel the farmer saves \$1.60 every time he converts a bushel of wheat into whole wheat flour. With dollar wheat the saving amounts to \$2.00.

Dr. Murlin estimates the annual per capita consumption of wheat in the United States at 240 pounds. At this rate the average family of 4 1/2 persons consumes about 1,080 pounds per year, or 18 bushels. With wheat at 80 cents a bushel the saving to the family grinding whole wheat flour at home totals \$28.80 per year. In the case of dollar wheat the saving is \$36. In addition there would be other appreciable savings from the home

grinding of cereals, corn meal, grits, etc., to say nothing about the greater freshness and convenience of the home product. If we put the average savings per family at \$30 and the number of farm families at six and a half million, the possible annual savings on the farm family food bill would be about \$185,000,000.

EQUIPMENT FOR HOME AND COMMUNITY MILLING

Various sizes and types of electric mills for home and community grinding of whole wheat flour, corn meal, and other grain products are now available.

REA has experimented with a number of small mills ranging in price from around \$20 to \$25 up to \$550. These prices include motor and other necessary equipment. All make a fairly acceptable whole wheat flour, but with the exception of one or two the mills run into more money than the average farm family can afford to pay for a mill solely for its own use. The more expensive types are suitable for community use where the expense is shared by several families.

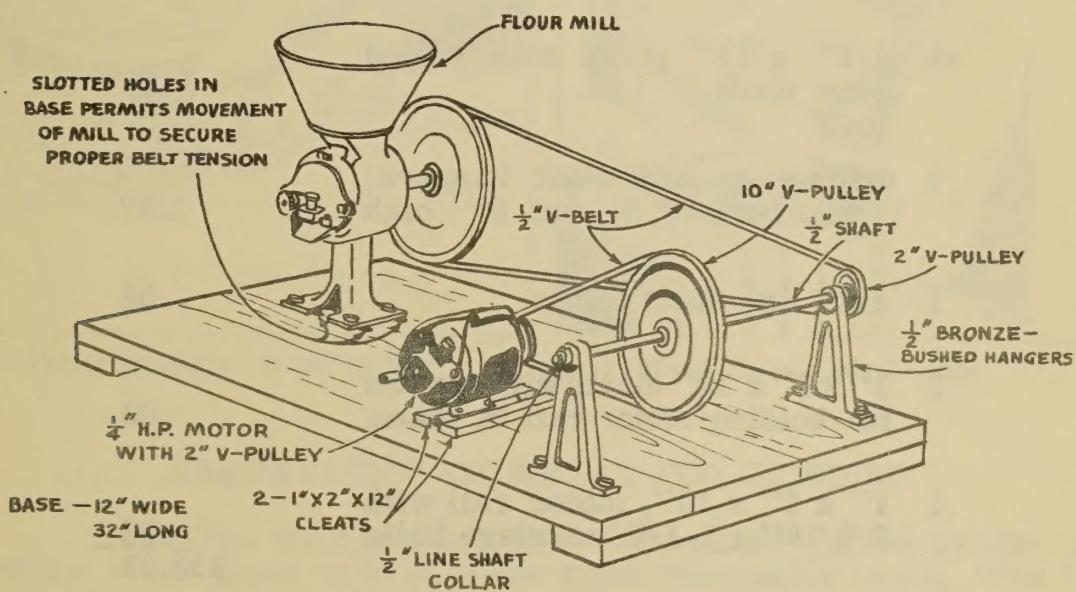


Figure 2. HOME MILL EQUIPPED WITH MOTOR AND SPEED REDUCER.

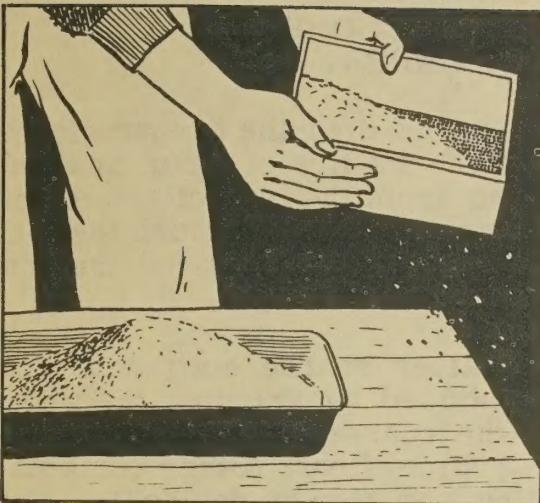
There is described here (Figure 2) detailed data for one of the small mills which produces a good quality of whole wheat flour and which sells at a price that many farm families can easily afford, especially if they already own a portable fractional horse power motor. REA cooperative superintendents have complete and current data on other models.

BILL OF MATERIALS FOR HOME FLOUR MILL

<u>Materials and Equipment</u>	<u>Approx. Cost</u>
1 Belt-operated flour mill with two 3/8" bolts and washers for attaching to table or board with 10" V-Pulley	\$8.00
1 V-Belt 1/2" x 66"	.63
1 V-Belt 1/2" x 42"	.40
1 2" V-Pulley on 1/2" shaft	.40
1 10" V-Pulley, 1/2" bore	1.39
1 1/2" x 12" piece cold rolled steel shaft	.15
2 Bronze-bushed shaft hangers, 1/2" bore - 7" or 8" high	1.90
1 1/2" line shaft collar	.08
2 1" x 2" x 12" cleats with screws for holding motor rail in place	.03
1 1" x 1" x 10", motor rail with 2-5/16" x 1-1/4" carriage bolts	.05 \$13.03

The mill should be operated with a portable 1/4 h.p. capacitor start or repulsion induction motor. This type of motor sells for \$10 to \$14.

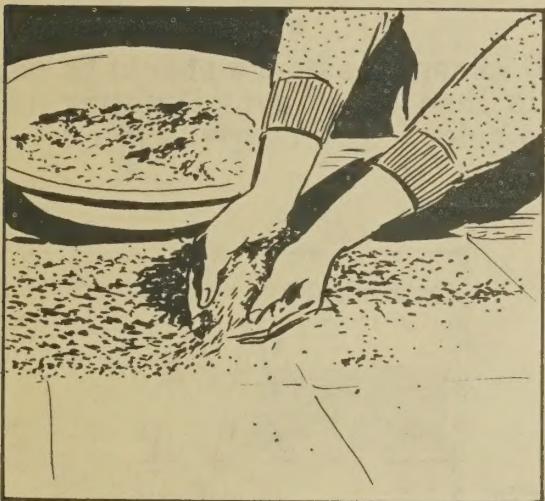
Two sifters with screens of different sizes are necessary in separating corn meal from grits. The home-made sifters, as shown in Figure 4, are sized so one fits into the other to save storage space. The coarse screen sifter is made from ordinary 16-mesh galvanized screen wire. The fine sifter is made from 22- to 24-mesh rust-proof wire.



1. SIFT WHEAT TO REMOVE FOREIGN MATERIAL



2. WASH WHEAT THOROUGHLY



3. SPREAD ON SHEET TO DRY IN SUN



4. STORE IN TIGHT CAN OR BIN

PREPARATION OF WHEAT FOR GRINDING

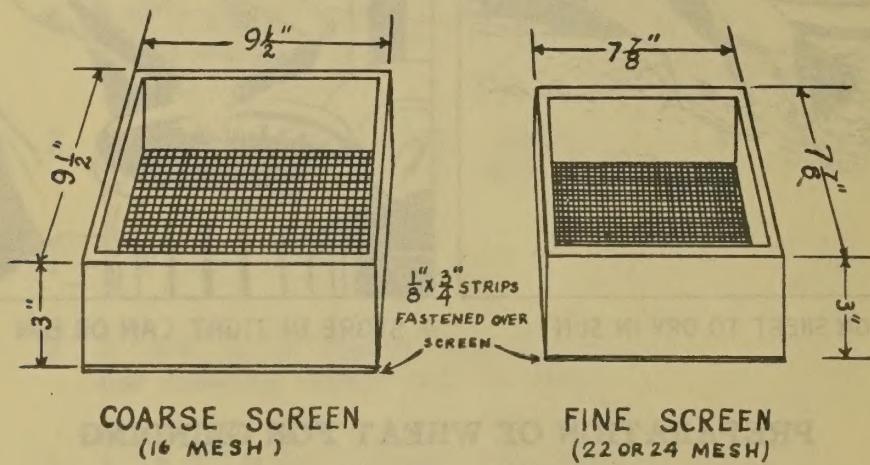
The first requirement for making a good quality of whole wheat flour is to have the wheat thoroughly clean. This is accomplished by first sifting the wheat to remove fine dust, grit, or other foreign material. Next, put the wheat in a large pan or tub and wash it thoroughly several times. Immature grains and other light material come to the top of the water and are easily removed. Pick out any foreign seeds or coarse matter that remain. After several washings, lasting not over five minutes altogether, the grain should be spread out on a clean sheet to dry in the sun. Stirring occasionally will hasten the drying. After the wheat is thoroughly dry it should be placed in a tight can, bin, or other suitable container and ground as needed.

GRINDING WHOLE WHEAT FLOUR AND WHOLE WHEAT CEREAL

Different methods can be used in the preparation of whole wheat flour, depending upon the quality of flour desired. To secure a really fine grade of flour from the type of small mill illustrated above it is advisable to run the wheat through the mill a second time. Some mills grind as fine as desired the first time.

Some people prefer a rather coarse nutty-text red whole wheat flour. This can be obtained by grinding the wheat medium fine and then sifting out the coarse material for a re-grinding and mixing with the first sifted flour. Other combination methods of grinding and sifting may also be desirable. For making loaf bread many prefer hard wheat alone or a mixture of hard and soft wheat.

In making whole wheat cereal the burrs should be set for coarse grinding. The flour is then sifted out. Roasting the whole wheat cereal in a slow oven before cooking gives it a delicious nutty flavor.



GRINDING CORN MEAL AND GRITS

Corn, like wheat, should be thoroughly clean before grinding. This can be done by sifting out any dust or fine particles and picking out coarse or foreign material. By adjusting the burrs to give a medium fine product, both meal and grits can be made from the same grinding. The first sifting should be made through a fine sifter (22- to 24-mesh). This gives a fine grade of meal. The next sifting, which gives grits, should be made through a 16-mesh sifter (ordinary galvanized fly screen). The coarse material still remaining can be reground for more meal and grits or it can be fed to chickens or hogs.



"Bread, during long centuries, has been the 'staff of life.' Until recently we have made it a very frail and feeble reed by 'scalping' out of the wheat berry most of the vitamins and minerals which the good Lord put into it for our protection."

**Surgeon General Thomas Parran
U. S. Public Health Service**